Guide to: Probability trees

maths Links

Explanation:

On a probability tree diagram, each pair of branches from the same point must **add up to 1**. Multiply along the branches for **AND** (**P(A and B) = P(A) × P(B)**), and add the end probabilities together when more than one path satisfies the question (**OR**).

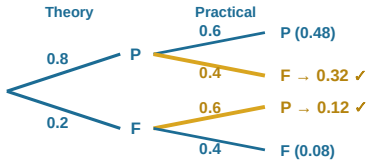
Check whether items are picked **with replacement** (second-pick probabilities stay the same) or **without replacement** (reduce total denominator by 1 on the second branches, and reduce the numerator by 1 if that colour was already picked).

Example 1: The probability Sam passes his theory test is **0.8** and practical test is **0.6**. Find the probability he passes **only one** test.

Solution:

P(P, F) = 0.8 × 0.4 = **0.32**; P(F, P) = 0.2 × 0.6 = **0.12**

Answer: 0.32 + 0.12 = **0.44**



Example 2: A bag has **5 red** and **3 blue** counters. Two are picked **without replacement**. Find P(both same colour).

Solution:

P(Red, Red) = $\frac{5}{8} \times \frac{4}{7} = \frac{20}{56}$

P(Blue, Blue) = $\frac{3}{8} \times \frac{2}{7} = \frac{6}{56}$

Total = $\frac{20}{56} + \frac{6}{56} = \frac{26}{56} = \mathbf{\frac{13}{28}}$

Answer: $\mathbf{\frac{13}{28}}$

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